

Evaluation of a modified social defeat paradigm with reminder-defeat sessions across depression and anxiety assay in C57BL/6 and NMRI mice

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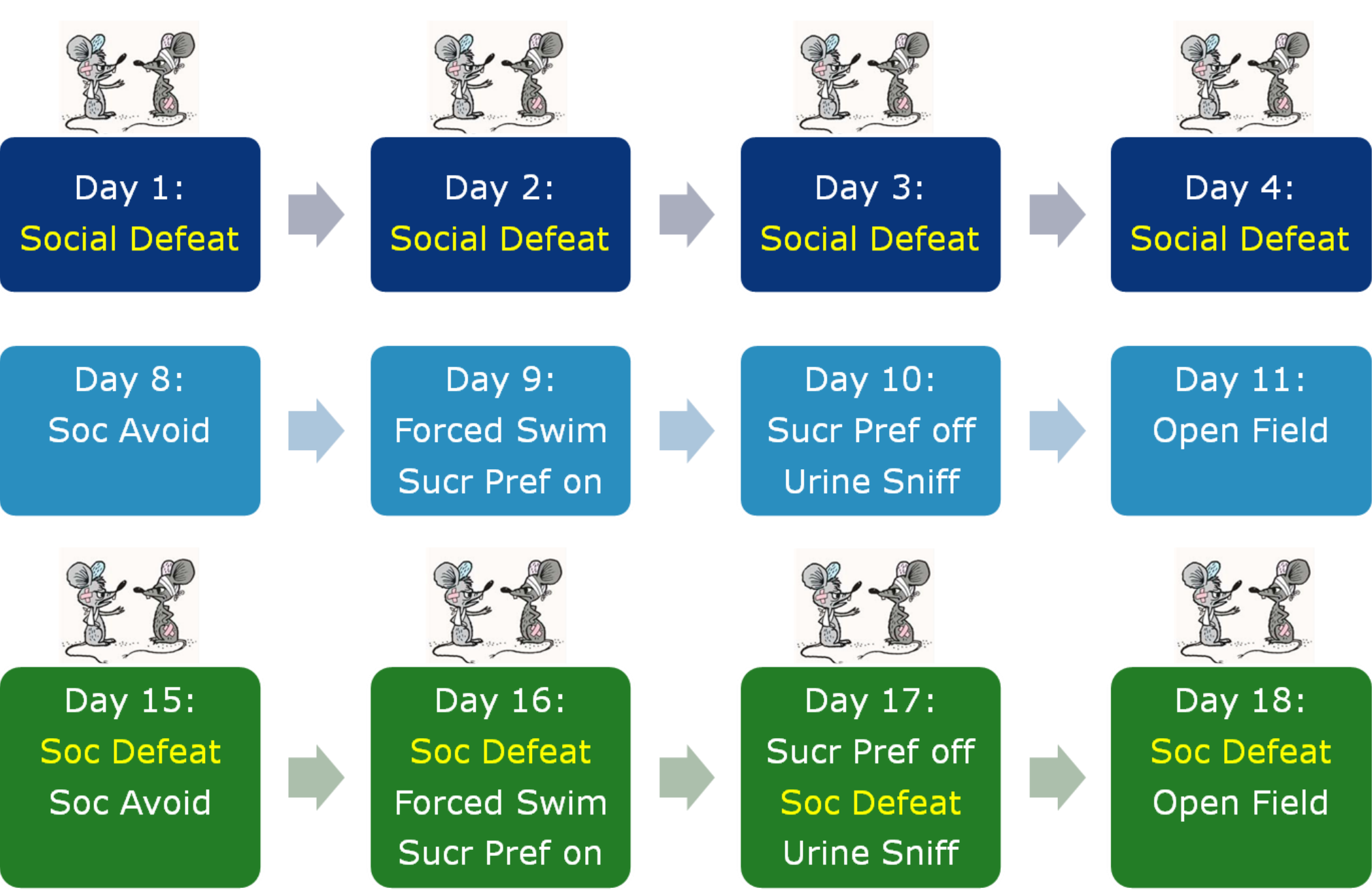
INTRODUCTION

Exposure to social defeat (SD) is a biologically relevant manipulation to induce a pathological state in rodents. Interestingly, SD elicits a variety of behavioral and molecular responses, which is seen in about 50% of the SD exposed mice, while the other 50% of animals are non-responding (Krishnan, 2007, Cell, 131, p391).

METHODS

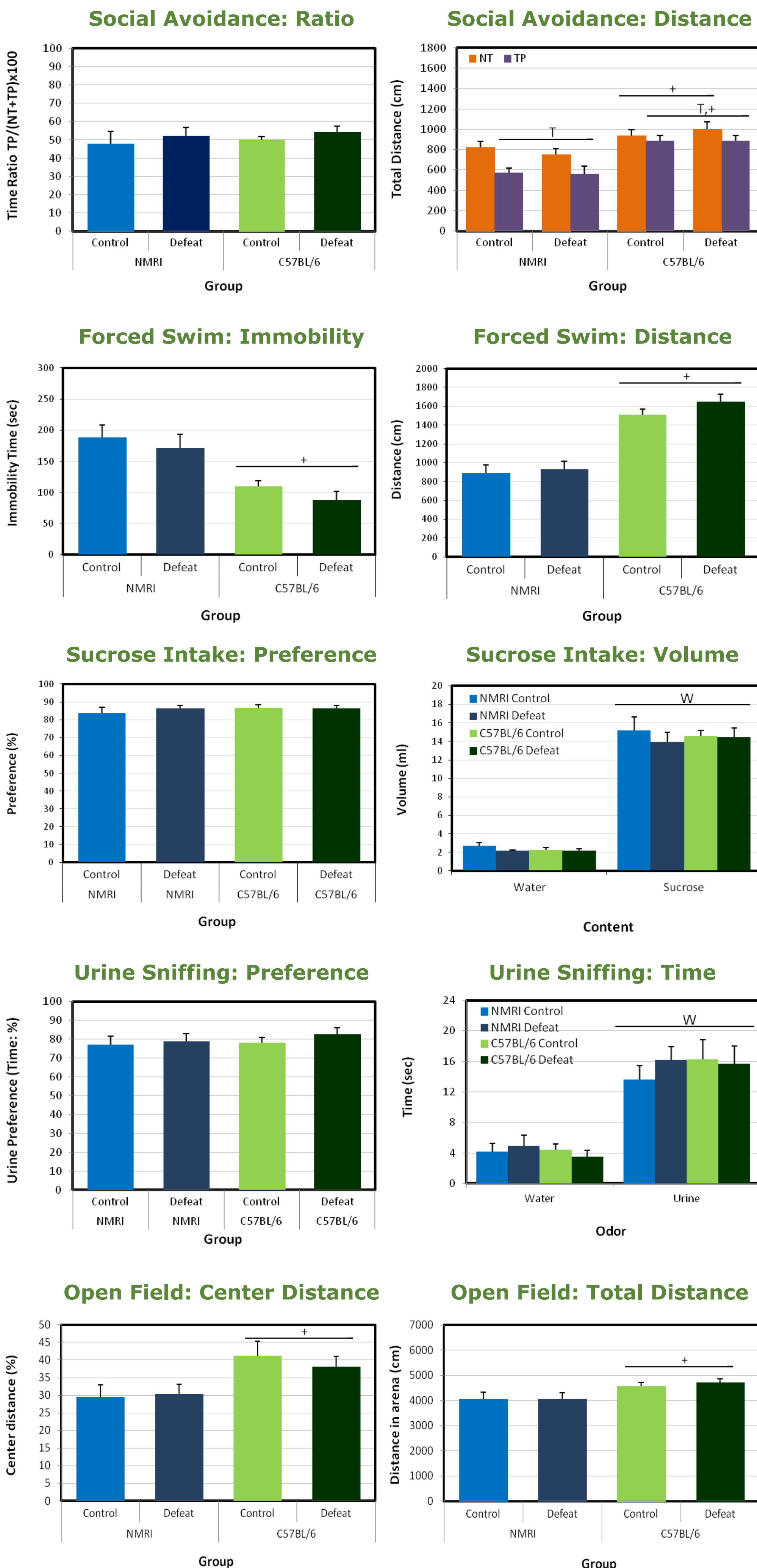
In the present experiment, a short version with 4-days 10-min/day of SD was employed in NMRI and C57BL/6 (B6) mice, which were defeated by adult single-housed NMRI resident mice. One week after the start of SD, mice were exposed to a series assays being social avoidance (SA), forced-swim (FS), sucrose preference (SP), female urine sniffing (FUS) and open-field (OF) on consecutive days. One week later, mice were exposed to the same series of assays, though here the behaviors were measured 30 min after a reminder-defeat session (RSD). The idea behind the reminder defeat is to potentially reinforce the impact of previous experience.

STUDY DESIGN



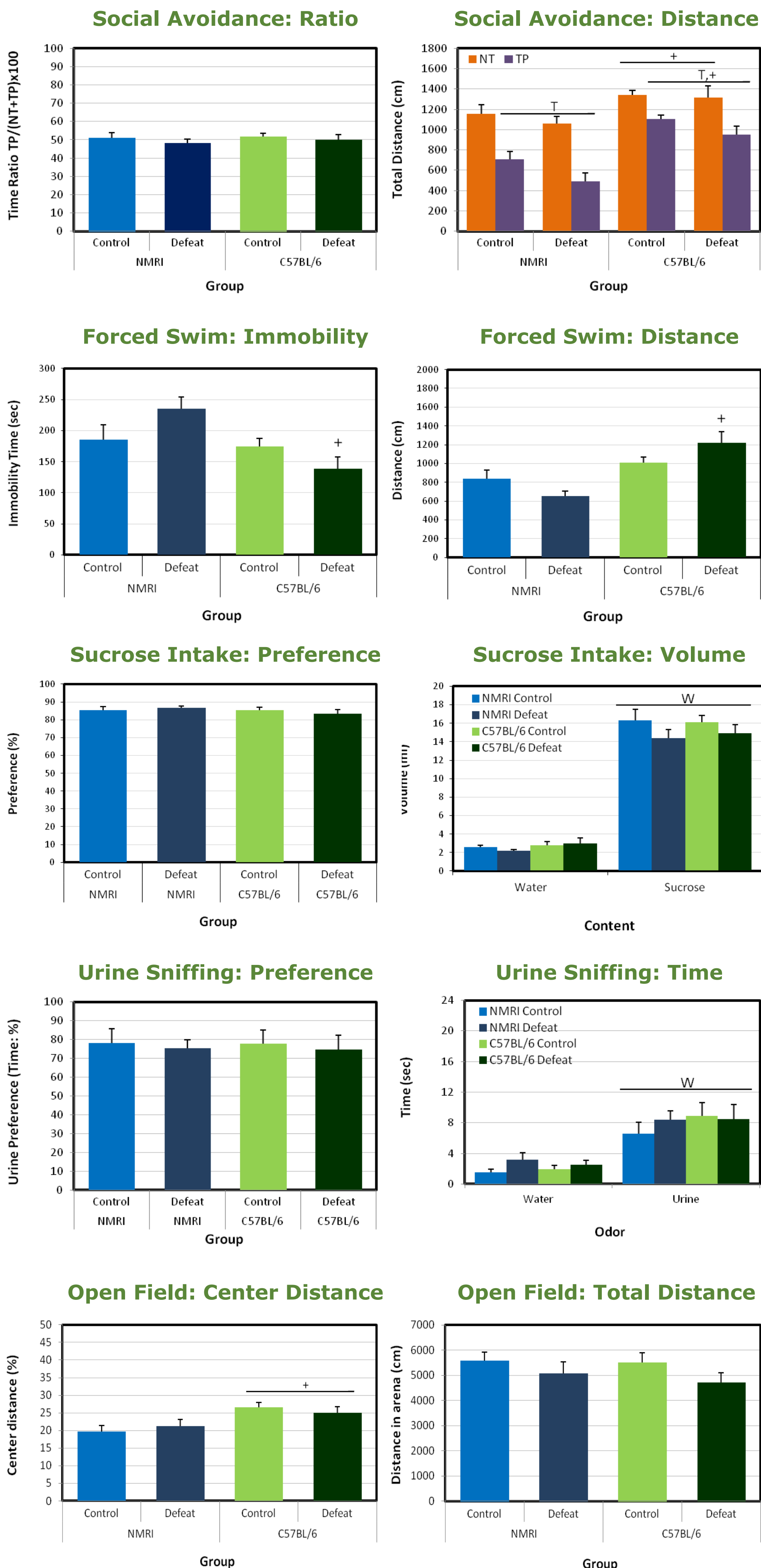
RESULTS without Reminder Defeat

Abbreviations: NT = no target mouse and TP = target mouse present



RESULTS with Reminder Defeat

Symbols are +: P<0.05 versus NMRI, W: P<0.05 versus Water, and T: P<0.05 versus No Target present



RESULTS

First, there was no effect of SD exposure on behavior in the SA test in both strains, while after RSD exposure a small reduction in social exploration was seen in defeated mice. The FS elicited higher immobility time in NMRI versus B6 mice, without any effect of SD. Retesting in FS test independent of RSD increased immobility. The SP test showed strong preference for 5% sucrose and no effects of strain, SD or RSD. Similar results were seen in the FUS, with a strong preference for urine over water, but no effects of strain or SD. Interestingly, during the RSD phase, the overall sniffing time reduced independent of group while the preference for urine was unaffected. Finally, in the OF test, only mild strain differences were seen in exploration, while there was no effect of SD or RSD.

CONCLUSION

- ✓ A short protocol with 4-days of 10-min/day social defeat was not sufficient to elicit behavioral effects one week later in 2 strains
- ✓ Exposure to reminder defeat sessions just before behavioral retesting did not reveal the potential impact of defeat experience
- ✓ Some assays like FS and FUS are sensitive to repeated testing as seen in non-defeated mice
- ✓ One important difference with the Krishnan protocol is that in our study the defeated mice after each defeat session were housed in separated cages. Instead, Krishnan housed them in the same cage with the resident separated by a wall that allows interaction without physical contact. The impact of such housing conditions should be evaluated.